

NATURAL RESOURCES CONSERVATION SERVICE CONSERVATION PRACTICE STANDARD

ACCESS ROAD

(ft)

CODE 560



DEFINITION

A travel-way for equipment and vehicles constructed as part of a conservation plan.

PURPOSE

To provide a fixed route for vehicular travel for resource activities involving the management of timber, livestock, agriculture, wildlife habitat, and other conservation enterprises while protecting the soil, water, fish, wildlife, and other adjacent natural resources.

CONDITIONS WHERE PRACTICE APPLIES

Where access is needed from a private or public road or highway to a land use enterprise or conservation measure, or where travel ways are needed in a planned land use area.

Access roads range from seasonal use roads, designed for low speed and rough driving conditions, to all-weather roads heavily used by the public and designed with safety as a high priority. Some roads are only constructed for a single purpose; i.e. control of forest fires, logging and forest management activities, access to remote recreation areas, or access for maintenance of facilities.

CRITERIA

Access roads shall be designed to serve the enterprise or planned use with the expected vehicular or equipment traffic. The type of vehicle or equipment, speed, loads, soil, climatic, and other conditions under which vehicles and equipment are expected to operate need to be considered. Planned work shall comply with all federal, state and local laws and regulations.

Where general public use is anticipated, roads shall be designed to meet applicable federal, state and local criteria.

Location. Roads shall be located to serve the purpose intended, to facilitate the control and disposal of surface and subsurface water, to control or reduce erosion, to make the best use of topographic features, and to include scenic vistas where possible. The roads should generally follow natural contours and slopes to minimize disturbance of drainage patterns. Roads shall be located where they can be maintained and where water management problems are not created. To reduce potential pollution, roads shall be located away from watercourses and utilize buffers where possible to protect waterbodies.

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

Alignment. The gradient and horizontal alignment shall be adapted to the intensity of use, mode of travel, the type of equipment and load weights, and the level of development.

Grades normally should not exceed 10 percent except for short lengths. Maximum grades of 18 percent should only be exceeded if necessary for special uses such as logging roads, field access roads, fire protection roads or other roads not accessible for use by the general public.

For stream crossings, the road should be aligned so that it crosses perpendicular to the channel as much as possible.

Frequent grade changes generally cause fewer erosion problems than long, continuous gradients. Curves must be of sufficient radius for trucks and other large vehicles to negotiate easily. The radius should be no less than 35 feet for standard vehicles and 50 feet for tractor-trailers.

Width. The minimum width of the roadbed is 14 ft for one-way traffic and 20 ft for two-way traffic. The roadbed width includes a tread-width of 10 feet for one-way traffic or 16 feet for two-way traffic. Each type of road also requires 2 feet of shoulder width on each side. Single-lane logging or special-purpose roads can have a minimum width of 10 feet, with greater widths at curves and turnouts. The two-way traffic width shall be increased approximately 4 feet for trailer traffic. The shoulder width may be either gravel or grass.

Turnouts shall be used on single lane roads where vehicles travel in both directions on a limited basis. Where turnouts are used, road width shall be increased to a minimum of 20 feet for a distance of at least 30 feet.

Side slopes. All cuts and fills shall be designed to have stable slopes of a minimum of 2 horizontal to 1 vertical on heights of less than 4 feet. For short lengths, rock areas, or very steep hillsides, steeper slopes may be permitted, if soil conditions warrant and special stabilization measures are installed.

Areas with geological conditions and soils subject to slides shall be avoided or treated to prevent slides.

Drainage. The type of drainage structure used will depend on the intended use and runoff conditions. Culverts, bridges, fords, or grade dips for water management shall be provided at all natural drainageways. The capacity and design shall be consistent with sound engineering principles and shall be adequate for the class of vehicle, type of road, development, or use. When a culvert or bridge is installed in a drainage way, its minimum capacity shall convey the design storm runoff without causing erosion or road overtopping. Table 1 lists minimum design storm frequencies for various road types.

Table 1

Road Type	Storm Frequency
Forest Access Roads, Farm Field Access Roads	2 year - 24 Hour
Farm Driveways, Recreation Facility Access Roads	10 year - 24 Hour
Public Access Roads, Camp grounds, Etc.	25 year - 24 Hour

An erosion-resistant low point or overflow area may be constructed across the access road to supplement culvert capacity on non-public use roads. Culverts, bridges, fords and hardened overflow areas should be installed so the road crossing does not significantly impact fish migration.

Roadside ditches shall be adequate to provide surface drainage for the roadway and deep enough, as needed to serve as outlets for subsurface drainage. At a minimum, the roadside ditch shall be 1.0 foot below the top of road surface to provide internal drainage. Ditch channels shall be designed to be on stable grades or protected with structures or linings for stability.

Water-breaks may be used to control surface runoff on low-intensity use forest, farm, or similar roads. On steep grades where runoff and erosion is anticipated down the road, water breaks should be considered.

Water breaks are a combined shallow trench and ridge constructed across a road to intercept and divert side ditch or surface runoff. The following guides should be followed for installing water breaks:

1. Water breaks must be constructed of materials that are compatible with the use and maintenance of the road surface.
2. Dig a shallow trench 6" to 12" deep at an angle of approximately 30 degrees downslope to turn surface water off the road.
3. The uphill end of the bar shall extend beyond the side ditch line to fully intercept any ditch flows.
4. The outflow end of the bar should be fully open and extend far enough beyond the edge of road to safely convey runoff water away from the road surface.
5. Water breaks discharge areas must be well vegetated or have other erosion resistant materials.
6. Water breaks should be installed at strategic locations, using the following:

Recommended Water-Break Spacing

Road Grade (%)	Spacing (Ft.) *
2-4	200
4-6	135
6-9	100
9-12	80
12-18	60

*(Recommended spacing based on average soil conditions and precipitation amounts)

Broad-based drainage dips (Figure 1) should be used instead of side ditches where possible. Broad based dips are a dip and reverse slope in the road surface with an outslope in the dip to provide natural cross drainage. The purpose of the dip is to prevent build-up of excess surface runoff and subsequent erosion. Because of construction characteristics, dips should not be used on a road that has a grade greater than 10%.

The dips should be installed during initial road construction, using the following design criteria:

1. Construct a 20-foot long, 3 percent reverse grade in the roadway by cutting from upgrade of the dip location and using cut material for the reverse grade.
2. Broad base dips should be spaced as follows:

Recommended Broad Based Dip Spacing

Road Grade (%)	Spacing (Ft.) *
1	500
2	300
5	180
10	140

3. The dip and reverse grade section may require bedding with gravel for stability.
4. Install dips to outlet water on flatter areas when possible.

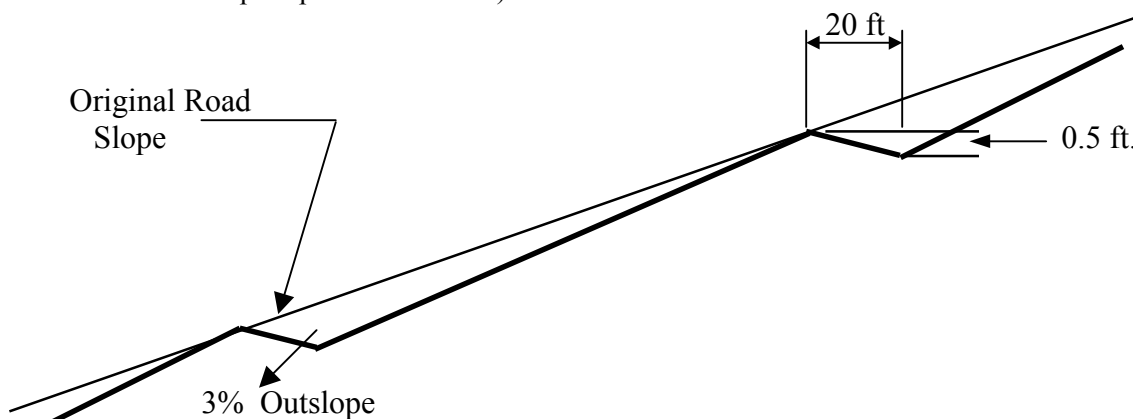


Figure 1 - Broad Based Dip

Surface crowning can also help direct road runoff into the side drainage ditches. Unobstructed flow into the ditches must be maintained to prevent flows from causing roadside erosion.

Provide a turnaround at the end of dead end roads. In some areas, turnarounds may also be desirable for stream, lake, recreation, or other access purposes.

Provide parking space as needed to keep vehicles off the road or from being parked in undesirable locations.

Surfacing. Access roads shall be given a wearing course or surface treatment if required by traffic needs, soil, climate, erosion control, or dust control. The type of treatment, if needed, depends on local conditions, available materials, and the existing road base. If these factors or the volume of traffic is not a problem, no special treatment of the surface is required. On weak bearing capacity soils such as silts, organics, and clays, the surface treatment should be underlain with a geotextile material specifically designed for road stabilization applications when the road is used on a regular basis.

Unsurfaced roads may require controlled access to prevent damage or hazardous conditions during adverse climatic conditions. Toxic and acid-forming materials shall not be used on roads. This should not be construed to prohibit use of chemicals for dust control and snow and ice removal after considering potential impacts on stabilizing vegetation.

Construction Operations. Construction operations should be carried out in such a manner that erosion and air and water pollution are minimized and held within legal limits. Construction shall include the following requirements as necessary for the job:

1. Trees, stumps, roots, brush, weeds, and other objectionable material shall be removed from the work area.
2. Unsuitable material shall be removed from the roadbed area.

3. Grading, sub-grade preparation, and compaction shall be done as needed.
4. Surfacing shall be done as needed.

Traffic safety. Passing lanes, turnouts, guardrails, signs, and other facilities as needed for safe traffic flow shall be provided. Traffic safety shall be a prime factor in selecting the angle and grade of the intersection with public highways. Preferably, the angles shall be not less than 85 degrees. The public highway shall be entered either at the top of a hill or far enough from the top or a curve to provide visibility and a safe sight distance. The clear sight distance to each side shall not be less than 300 feet or as required by local regulations.

Erosion control. If soil and climatic conditions are favorable, roadbanks and disturbed areas shall be vegetated as soon as possible and skid trails, landings, logging, and similar roads shall be vegetated after harvesting or seasonal use is completed (see Critical Area Planting). If the use of vegetation is precluded and protection against erosion is needed, protection shall be provided by non-vegetative materials, such as gravel or other organic or inorganic material (see Mulching), or in accordance with local regulations.

Roadside channels, cross drains, and drainage structure inlets and outlets shall be designed to be stable (see Structure for Water Control). If protection is needed, riprap or other similar materials shall be used.

Watercourses and water quality shall be protected during and after construction by erosion-control facilities and maintenance. Filter strips, water and sediment control basins, and other conservation practices shall be used and maintained as needed.

CONSIDERATIONS

Consider visual resources and environmental values during the planning and designing of the road system.

Access roads should be located where minimal adverse impacts will affect wetlands, waterbodies and wildlife habitat.

Consideration should be given to the following:

- Effects on downstream flows or aquifers that would effect other water uses or users.
- Effects on the volume and timing of downstream flow to prohibit undesirable environmental, social, or economic effects.
- Short-term and construction-related effects of this practice on the quality of on-site downstream water courses.
- Overall effects on erosion and the movement of sediment, pathogens, and soluble and sediment-attached substances that would be carried by runoff from construction activities.
- Effects on wetlands and water-related wildlife habitats that would be associated with the practice.

PLANS AND SPECIFICATIONS

Plans and specifications for constructing access roads shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

OPERATION AND MAINTENANCE

An operation and maintenance plan will be developed and carried out for the life of the practice:

1. Inspect culverts, roadside ditches, water bars, and outlets after each major runoff event and restore flow capacity as needed.
2. Maintain vegetated areas in adequate cover. Re-seed and mow as needed.
3. Fill low areas in travel treads and re-grade, as needed, to maintain road cross section.
4. Inspect roads with water-bars periodically to insure proper cross section is available and outlets are stable.

**NATURAL RESOURCES CONSERVATION SERVICE
SPECIFICATIONS**

ACCESS ROAD

Construction operations shall be carried out in such a manner that erosion and air and water pollution are minimized and held within legal limits. The completed job shall present a workmanlike finish. Construction shall be according to the following requirements as specified for the job:

1. Trees, stumps, roots, brush, weeds, and other objectionable material shall be removed from the work area.
2. Unsuitable material shall be removed from the roadbed area.
3. Grading, subgrade preparation, and compaction shall be done as needed. Fill material shall be deposited in layers not to exceed 9 inches and compacted with the controlled movement of compacting and earth moving equipment.
4. The roadbed shall be graded to the required elevations. When special treatment of the road surface is required, subgrade preparation and placement of the surface course shall be in accordance with sound highway construction practice for the surface material used.
5. Structures such as culverts, pipe drops, or bridges shall be installed to the lines and grades shown on the plans or as staked in the field. Pipe conduits shall be placed on a firm foundation. Selected backfill material shall be placed around the conduit in layers not to exceed 6 inches. Each layer shall be properly compacted.
6. Roads shall be planned and laid out according to good landscape management principles.

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ENGINEERING NOTEKEEPING

Access road layout and construction checking shall be done following applicable procedures and notekeeping format contained in Technical Release 62. Supporting data are to be recorded for design layout and construction checkout. Engineering surveys and field notes may be recorded in bound field notebooks or approved forms.

Design Surveys and Construction Layout

- A. Record the following supporting data as a minimum.
1. Job identification and location. (Can be a sketch on the job plans, field notes, approved forms or a reference to the Conservation Plan Map). Date and name of person doing design and layout.
 2. Use of road.
 3. Design grades or maximum grades where applicable.
 4. Design road width and length.
 5. Design surface treatment.
 6. Cut and fill slopes, where applicable.
 7. Drainage areas and structure requirements for culverts, bridges, etc.
 8. Design spacing for broad based dips or water breaks where applicable.
 9. Vegetative requirements for slopes, shoulders, etc.

Construction Check

- A. Record the following data as a minimum.
1. Location check.
 2. Length of constructed road.
 3. Constructed road width.
 4. Grade checks, location of broad-based dips, and water breaks where applicable.
 5. Data for structures installed.
 6. Cut and fill slopes where applicable.
 7. Constructed surface treatment.
 8. Statement of adequacy of protection against erosion.
 9. Statement of compliance with plans and specifications.
 10. Date and signature of person making the construction check.